

**WHAT WE CLAIM IS:**

1. A soldering method comprising soldering a component to a printed circuit board using a selective soldering apparatus at a soldering station, automatically inspecting the board to detect the presence of a faulty joint, and automatically returning the board to the soldering station to re-solder the faulty joint.
2. A soldering method as claimed in claim 1, wherein the inspection is an optical inspection.
3. A soldering method as claimed in claim 2, wherein the inspection identifies which joints are, or are likely to be, faulty.
4. A soldering method as claimed in claim 3, wherein when the board is returned to the soldering station only joints identified as being faulty, or components having faulty joints, are re-soldered.
5. A soldering method as claimed in claim 1, wherein a board is inspected while another board is being soldered.
6. A soldering method as claimed in claim 1, wherein an inspected board and an upstream board pass one another in the production line, when the inspected board is re-soldered.
7. A soldering method as claimed in claim 6, wherein a board is moved on a conveyor to a return position and collected from the conveyor by a carriage at the soldering station.
8. A soldering method as claimed in claim 7, wherein the board is returned to the return position after soldering.

9. A soldering method as claimed in claim 7, wherein, if a board requires re-soldering, the board which is upstream (the upstream board) and has just been soldered is deposited on the conveyor and then moved upstream on the conveyor, upstream of the return position, so that the board to be re-soldered can be moved by the conveyor into the return position for collection by the carriage.

10. A soldering method as claimed in claim 9, wherein after collection of the board to be re-soldered, the upstream board is moved downstream to the inspection station.

11. A soldering method as claimed in claim 8, wherein the board to be re-soldered is moved upstream of the return position, the upstream board is deposited at the return position, and then both boards are moved downstream, respectively to the return position and the inspection station.

12. A soldering method as claimed in claim 8, wherein a soldered board is returned to the conveyor upstream of the return position, and a board to be re-soldered is conveyed back to the return position for collection by the carriage.

13. A soldering method as claimed in claim 1, wherein a re-soldered board is passed back to the inspection station, and a board is re-turned for re-soldering only a maximum pre-determined number of times.

14. A soldering method as claimed in claim 1, wherein a board to be re-soldered to be passed back to a fluxing and/or pre-heating station before re-soldering.

15. A soldering method as claimed in claim 14, wherein the fluxing and/or pre-heating stations are kept clear until the inspection of a board is completed, and a new board is fed to these stations only if the inspection is passed.
16. A soldering method as claimed in claim 1, wherein a board is soldered at a first dip soldering apparatus, and re-soldered at a second soldering apparatus at the soldering station.
17. A soldering apparatus comprising:  
a container for molten solder;  
a conveyor for a printed circuit board;  
a carriage for moving a said circuit board from the conveyor to the container to dip leads to be soldered into solder in the container to form soldered joints and returning the circuit board to the conveyor;  
apparatus for automatically inspecting a soldered joint to determine if the joint does not meet predetermined requirements; and  
apparatus for automatically returning the board to the carriage if a joint does not meet the predetermined requirements.
18. Apparatus as claimed in claim 17, wherein the automatic inspecting apparatus is arranged to inspect the board while the board is on the conveyor.
19. Apparatus as claimed in claim 17, wherein the conveyor is adapted to convey the board in forward and reverse directions, the conveyor being reversed to return the board to the carriage.
20. Apparatus as claimed in claim 17, wherein the inspection apparatus is operable to inspect a board while another board is being soldered.

21. Apparatus as claimed in claim 17, wherein apparatus is provided for moving an inspected board past an upstream soldered board.

22. Apparatus as claimed in claim 21, wherein a return position is provided on the conveyor and control apparatus is provided to move the board to the a return position for collection by the carriage.

23. Apparatus as claimed in claim 22, wherein the conveyor comprises two adjacent conveyor sections, which are operable independently to convey a board along the respective section, and the return position is provided on the downstream section.

24. Apparatus as claimed in claim 22, wherein control apparatus is provided to return the board to the return position after soldering.

25. Apparatus as claimed in claim 22, wherein control apparatus is provided for controlling the carriage to deposit a soldered board on the conveyor and controlling the conveyor to move the deposited board upstream on the conveyor, and moving a board to be re-soldered into the return position for collection by the carriage.

26. Apparatus as claimed in claim 24, wherein control apparatus is provided to control the conveyor to move a board to be re-soldered upstream of the return position, controlling the carriage to deposit the upstream board at the return position, and then controlling the carriage to move both boards downstream, respectively to the return position and the inspecting means.

27. Apparatus as claimed in claim 22, wherein control apparatus is provided to control the carriage to return a board to the conveyor upstream of the return position, to control the conveyor to move a board to be re-soldered back to the return position.

28. Apparatus as claimed in claim 17, wherein control apparatus is provided to limit the number of times a board is returned for re-soldering.
29. Apparatus as claimed in claim 17, wherein fluxing and/or pre-heating apparatus are provided, and control means is provided to convey a board to be re-soldered back to the fluxing and/or pre-heating means.
30. Apparatus as claimed in claim 29, wherein control apparatus is provided to keep the fluxing and/or pre-heating apparatus clear until the inspection of a board is completed, and to feed a new board to these stations only if the inspection is passed.